

CLAIMS:

1. A modular stringer for a staircase, the stringer comprising at least two matingly coupled step support units defining the stringer, said step support units each comprising a main structural body, a first mating structure extending substantially laterally from a first lateral side thereof and a second mating structure extending substantially laterally from an opposing lateral side thereof, said first mating structure of said step support unit being adapted to be matingly coupled with an adjacent second mating structure of an adjacent step support unit such that said adjacent unit is vertically offset therefrom.
2. The modular stringer as claimed in Claim 0, said first mating structure comprising a male mating structure and said second mating structure comprising a female mating structure.
3. The modular stringer as claimed in Claim 0, said first mating structure comprising at least one fastener integrally coupled thereto and said second adjacent mating structure comprising a corresponding fastening hole for each of said at least one fastener, said fastener engaging said second adjacent mating structure through said corresponding fastening hole thereby fastening said mating structures together.
4. The modular stringer as claimed in Claim 3, wherein said fastener is a threaded bolt, said bolt being secured within said corresponding hole by a nut.
5. The modular stringer as claimed in Claim 3, wherein said fastener comprises a transversal hole at a distal tip thereof, said fastener being secured within said corresponding hole by a securing pin fitted through said transversal hole.
6. The modular stringer as claimed in Claim 0, said first mating structure and said adjacent second mating structure comprising at least one pair of corresponding fastening holes, said

pair for fastening said first and said adjacent second structures together using at least one fastener engaged through said pair.

7. The modular stringer as claimed in Claim 6 wherein at least one of said corresponding fastening holes is threaded and wherein said fastener is a bolt threadingly engaged therein for fastening said first and said adjacent second mating structures.

8. The modular stringer as claimed in Claim 6 wherein said fastener is a bolt secured within said pair by a respective nut.

9. The modular stringer as claimed in Claim 6 wherein said first and said second mating structures define vertically oriented mating elements and wherein at least one of said corresponding fastening holes is a vertically elongated hole such that said first mating structure is vertically adjustably coupled and fastened to said adjacent second mating structure.

10. The modular stringer as claimed in Claim 9, wherein once said first and said adjacent second mating structures are fastened together, an additional pair of corresponding fastening holes is created to further secure said fastening of said mating structures using an additional fastener.

11. The modular stringer as claimed in Claim 10 wherein one of said additional pair of corresponding fastening holes is a predefined fastening hole.

12. The modular stringer as claimed in Claim 0, the modular stringer further comprising at least one intermediary mating member for each two step support units, said mating intermediary member being adapted for matingly fitting between said first mating structure and said adjacent second mating structure for the coupling thereof.

13. The modular stringer as claimed in Claim 0, the stringer further comprising an upper support unit and a lower support unit,

said upper support unit comprising a mating structure for a mated coupling thereof with one of said first or said second mating structure of an uppermost step support unit of the stringer and a means for supporting the stringer from a top end thereof, said lower support unit comprising a mating structure for a mated coupling thereof with one of said first or said second mating structure of a lowermost step support unit of the stringer and a means for supporting the stringer from a bottom end thereof.

14. The modular stringer as claimed in Claim 13, wherein said stringer is a self supported stringer.

15. The modular stringer as claimed in Claim 13, wherein said structural body of said step support units is adapted to be fastened to a support structure lining said stringer and extending substantially parallel to said structural body.

16. The modular stringer as claimed in Claim 15, wherein said support structure is a wall.

17. A step support unit to be matingly coupled with at least one structurally similar adjacent step support unit such that said adjacent unit is vertically offset therefrom, the unit for the construction of a modular stringer for a staircase, the step support unit comprising a main structural body, a first mating structure extending substantially laterally from a first lateral side thereof and a second mating structure extending substantially laterally from an opposing lateral side thereof, said first structure comprising at least one mating element and said second structure comprising at least one complementary mating element complementary to said mating element of said first structure and vertically offset therefrom.

18. The step support unit as claimed in Claim 17, wherein said mating element of said first structure defines same as a male mating structure and said complementary mating element of said second structure defines same as a female mating structure.

19. A kit for erecting a staircase between an upper and a lower structure, the kit comprising at least two modular stringers each comprised of an equal number of step support units defining the stringers and a series of steps adapted to be mounted to said step support units, said step support units each comprising a main structural body adapted to support said steps thereon, a first mating structure extending substantially laterally from a first lateral side thereof and a second mating structure extending substantially laterally from an opposing lateral side thereof, within a same stringer said first mating structure of said units being adapted to be matingly coupled with an adjacent second mating structure of an adjacent unit such that said adjacent unit is vertically offset therefrom.

20. The kit as claimed in Claim 19, the kit further comprising a sheeting adapted for covering an exposed surface of said step support units.

21. The kit as claimed in Claim 20, wherein said sheeting is adapted to be mounted to said step support units using an adhesive.

22. The kit as claimed in Claim 20, wherein said sheeting is adapted to be mounted to said step support units using a set of brackets fastened thereon.

23. The kit as claimed in Claim 19, said first mating structure comprising a male structure and said second mating structure comprising a female structure.

24. The kit as claimed in Claim 19, said first mating structure and said adjacent second mating structure of said same stringer comprising at least one pair of corresponding fastening holes, said pair for fastening said first and said adjacent second mating structures of said same stringer together using at least one fastener engaged through said pair.

25. The kit as claimed in Claim 24 wherein said first and said second mating structures define vertically oriented mating

elements and wherein at least one of said corresponding fastening holes of each said pairs is a vertically elongated hole such that said first mating structure is vertically adjustably coupled and fastened to said adjacent second mating structure of said same stringer.

26. The kit as claimed in Claim 25, wherein a relative height between successive steps in the staircase can be adjusted by vertically adjusting a relative height between corresponding successive step support units in said stringers.

27. The kit as claimed in Claim 25, wherein once said first and said adjacent second mating structures of said same stringer are fastened together, an additional pair of corresponding fastening holes can be created to further secure a fastening of said mating structures using an additional fastener.

28. The kit as claimed in Claim 19 and 26, each said stringer further comprising a top supporting means for supporting same from a top end thereof on the upper structure and a bottom supporting means for supporting same from a bottom end thereof on the lower structure, wherein once assembled and mounted between the upper structure and the lower structure, said stringers provide a self-supporting framework for the staircase.

29. The kit as claimed in Claim 28, said top supporting means comprising an upper support unit, said upper support unit comprising a mating structure for a mated coupling thereof with one of said first or said second mating structure of an uppermost step support unit of a given stringer and a support member extending outwardly therefrom for resting said top end of said given stringer on the upper structure, said bottom supporting means comprising a bottom support unit comprising a mating structure for a mated coupling thereof with one of said first or said second mating structure of a bottommost step support unit of a given stringer and a support member extending outwardly therefrom for resting said bottom end of said given stringer on the lower structure.

30. The kit as claimed in Claim 28, said steps each comprising a tread, said step support units each comprising at least one tread supporting element, each said tread being adapted to extend horizontally between two adjacent step support units of two different stringers and to be fastened at each longitudinal end thereof to said tread supporting elements, thereby providing a self-supported staircase.

31. The kit as claimed in Claim 30, wherein each said tread supporting element is comprised of a bracket providing a first flange for a fastening thereof to said structural body of said step support units and a second flange for a fastening thereof to a bottom side of said treads.

32. The kit as claimed in Claim 30, wherein said structural body of said step support units comprise a substantially horizontal top surface defining said tread supporting element and wherein said treads are fastened to said top surface.

33. The kit as claimed in Claim 30, wherein each said tread comprises a core, a cap fitted at each said longitudinal end thereof, and a protective sheeting wrapped laterally thereabout, said sheeting manufactured of at least one metallic material and installed on said core using a high tension lamination method.

34. The kit as claimed in Claim 33, wherein said core is manufactured of particle board.

35. The kit as claimed in Claim 33, wherein said stringers are manufactured of at least one metallic material thereby providing a kit for a staircase sufficiently fireproof to comply with standard industrial building codes and regulations.

36. The kit as claimed in Claim 19 or 28, the kit further for erecting a staircase between two lining structures lining the staircase, said units comprising means for selectively fastening same to the lining structures, wherein said stringers are erected by

coupling said step support units and selectively fastening same to the lining structures.

37. The kit as claimed in Claim 36, said steps each comprising a tread, said step support units each comprising at least one tread supporting element, each said tread being adapted to extend horizontally between two adjacent units of two different stringers and to be fastened at each tread longitudinal end thereof to said tread supporting elements.

38. The kit as claimed in Claim 37, wherein each said tread supporting element is comprised of a bracket providing a first flange for a fastening thereof to said structural body of said units and a second flange for a fastening thereof to a bottom side of said treads.

39. The kit as claimed in Claim 37, wherein said structural body of said step support units comprise a substantially horizontal top surface defining said tread supporting element and wherein said treads are fastened to said top surface.

40. The kit as claimed in Claim 39, the kit further comprising a set of brackets, said brackets adapted to provide a first flange to be fastened to a tread longitudinal face of said tread longitudinal ends and a second flange to be fastened to said top surface of said step support units.

41. The kit as claimed in Claim 40, wherein said first flange is adapted to be fastened within a recess provisioned therefor in said tread longitudinal face.

42. The kit as claimed in Claim 39, wherein a thickness of said top surface provides a longitudinal adjustment range for an installation of said treads thereto.

43. The kit as claimed in Claim 37, said steps each comprising a riser, said step support units each comprising at least one riser supporting element, each said riser being adapted to

extend horizontally between two adjacent step support units of two different stringers and to be fastened at each riser longitudinal end thereof to said riser supporting elements such that said risers define a substantially vertical surface extending upwardly between an area proximal to a rear end of a lower tread and an area proximal to a front end of an adjacent higher tread.

44. The kit as claimed in Claim 43, wherein each said riser supporting element is comprised of a bracket providing a first flange for a fastening thereof to said structural body of said step support units and a second flange for a fastening thereof to a rear side of said risers.

45. The kit as claimed in Claim 43, wherein said structural body of said step support units comprise a substantially vertical front surface extending upwardly above one of either said first or said second mating structure and defining said riser supporting element and wherein said risers are fastened to said front surface.

46. The kit as claimed in Claim 45, the kit further comprising a set of brackets, said brackets adapted to provide a first flange to be fastened to a riser longitudinal face of said riser longitudinal ends and a second flange to be fastened to said front surface of said step support units.

47. The kit as claimed in Claim 46, wherein said first flange is fastened within a recess provisioned therefor in said riser longitudinal face.

48. The kit as claimed in Claim 47, wherein a thickness of said front surface provides a longitudinal adjustment range for an installation of said risers thereto.

49. The kit as claimed in Claim 43, the kit further comprising finishing elements, wherein said finishing elements are adapted to provide a finished look to the staircase.

50. The kit as claimed in Claim 49, wherein said finishing elements comprise substantially triangular elements adapted to be fitted along the lining structures between each said step juxtaposed about an area proximal to a top surface of said tread longitudinal ends and an area proximal to a front surface of said riser longitudinal ends.

51. The kit as claimed in Claim 50, said finishing elements further comprising mouldings adapted to be mounted along the staircase above said substantially triangular elements.

52. The kit as claimed in Claim 36, each said step comprising a tread and a riser, the kit further comprising a set of step mounting brackets used to mount said treads and said risers to said step support units, said structural body of said step support units comprising a substantially horizontal top surface defining a tread supporting surface and a substantially vertical front surface extending upwardly above one of either said first or said second mating structure defining a riser supporting surface, wherein said treads and said risers are adapted to extend horizontally between two adjacent step support units of two collinear stringers and wherein said treads and said risers are adapted to be respectively fastened at each longitudinal end thereof to said tread supporting surface and to said riser supporting surface such that a mounted tread will define a substantially horizontal tread surface and a mounted riser will define a substantially vertical riser surface extending upwardly from an area proximal to a rear end of said mounted tread and an area proximal to a front end of an adjacent higher mounted tread.

53. The kit as claimed in Claim 52, wherein a first flange of said step mounting brackets is adapted to be fastened within a recess provisioned therefor in a longitudinal face of said longitudinal ends of both said treads and said risers and wherein a second flange of said step mounting brackets is adapted to be fastened to both said top surface and to said front surface of said step support units.

54. The kit as claimed in Claim 53, the kit further comprising finishing elements adapted to be mounted between each said step to said step support units.

55. The kit as claimed in Claim 54, the kit further comprising finishing brackets, said finishing brackets comprising a first flange adapted to be fastened within said recess of both said risers and said treads, and a second flange adapted to secure said finishing elements between same and said longitudinal face of both said treads and said risers.

56. The kit as claimed in Claim 55, the kit further comprising mouldings adapted to be mounted above said finishing elements such that once said steps, said finishing elements and said mouldings are mounted on said stringers, said stringers, said step mounting brackets and said finishing brackets are substantially hidden from view from a top and a front side of said steps.

57. The kit as claimed in Claim 56, wherein a thickness of said front surface and said top surface provides a longitudinal adjustment range for an installation of said treads and said risers to compensate for imperfections in said lining structures and wherein said mouldings provide a means for substantially hiding said lateral adjustment range and thus said imperfections.

58. The kit as claimed in Claim 52, the kit further comprising stringer covering means adapted to cover exposed surfaces of said stringers on an underside of said staircase.

59. A modular stringer for a staircase, the stringer comprising at least two coupled free standing step support units defining the stringer, said step support units each comprising at least one shaft extending vertically at least partially along a first lateral side thereof and at least one coupling arm extending substantially laterally and horizontally from an opposing lateral side thereof, said coupling arm of a first step support unit being adapted for accepting and solidly retaining said shaft of an adjacent step support unit

therein such that said adjacent step support unit may be vertically offset therefrom.

60. The modular stringer as claimed in Claim 59, wherein said shaft is longer than a vertical thickness of said coupling arm thereby allowing said vertical offset between two adjacent step support units to be variable.

61. The modular stringer as claimed in Claim 59, wherein a length of said coupling arm is variable thereby allowing a horizontal offset between two adjacent step support units to be variable.

62. The modular stringer as claimed in Claim 59, wherein said shaft is adapted for being optionally and variably pivoted within said coupling arm of an adjacent support unit thereby allowing the stringer to curl variably.

63. The modular stringer as claimed in Claim 59, the stringer extending upwardly from a lower structure to an upper structure, the stringer further comprising an upper support unit and a lower support unit, said upper support unit comprising a coupling structure for a coupling thereof with one of said shaft or said extending arm of an uppermost step support unit of the stringer and a means for the fastening thereof to the upper structure, said lower support unit comprising a coupling structure for a coupling thereof with one of said shaft or said extending arm of a lowermost step support unit of the stringer and a means for the fastening thereof to the lower structure.

64. The modular stringer as claimed in Claim 63 wherein the stringer comprises a self supporting stringer.

65. The modular stringer as claimed in Claim and 64, wherein the stringer comprises a self supporting curling stringer.

66. A kit for erecting a curling staircase lined by an outside structure defining an outside curl of said staircase, the kit comprising

a modular stringer comprised of at least two modular step support units defining the stringer, a set of corresponding wall mountable step support units and a set of steps adapted to be mounted on said step support units, said modular step support units each comprising at least one shaft extending vertically at least partially along a first lateral side thereof and at least one coupling arm extending substantially laterally and horizontally from an opposing lateral side thereof, said coupling arm of said modular step support units being adapted for accepting and solidly retaining said shaft of an adjacent modular support unit therein such that said adjacent modular support unit may be vertically offset therefrom.

67. The kit as claimed in Claim 66, wherein said shaft is longer than a vertical thickness of said coupling arm thereby allowing said vertical offset between two adjacent modular support units to be variable.

68. The kit as claimed in Claim 66, wherein a length of said coupling arm is variable thereby allowing a horizontal offset between two adjacent modular support units to be variable.

69. The kit as claimed in Claim 66, wherein said shaft is adapted for being optionally and variably pivoted within said coupling arm of an adjacent modular support unit thereby allowing said stringer to curl variably.

70. The kit as claimed in Claim 66, said steps each comprising a tread, each said modular step support unit comprising a substantially horizontal top surface defining a tread supporting surface, said wall mountable support units comprising wall mountable tread support units defining a tread supporting surface, said treads being adapted to be mounted on said tread supporting surfaces such that said treads extend substantially horizontally from said stringer to the wall.

71. The kit as claimed in Claim 70, said steps each comprising a riser, each said modular step support unit comprising a

substantially vertical front surface defining a riser supporting surface, said wall mountable support units comprising wall mountable riser support units defining a riser supporting surface, said risers being adapted to be mounted on said riser supporting surfaces such that said risers extend substantially vertically from an area proximal to a rear end of a mounted lower tread and an area proximal to a front end of an adjacently mounted upper tread.

72. The kit as claimed in Claim 71, the kit further comprising finishing modules adapted to be mounted on an exposed side of said modular step support units.

73. The kit as claimed in Claim 72, wherein said finishing modules are adapted to be mounted using an adhesive.

74. The kit as claimed in Claim 72, wherein said finishing modules are adapted to be mounted using a set of brackets, said brackets adapted to be fastened to said modular step support units.

75. The kit as claimed in Claim 71, wherein said shaft is longer than a thickness of said coupling arm thereby allowing a vertical offset between two adjacent modular step support units to be variable and allowing steps of variable heights to be mounted.

76. The kit as claimed in Claim 75, wherein a length of said coupling arm is variable and wherein said shaft is adapted for being optionally and variably pivoted within said coupling arm of an adjacent modular support unit such that a curl and pitch of the staircase may be variably customized.

77. A kit for erecting a staircase between two lining structures, the kit comprising at least two stringers adapted to be mounted to said lining structures and a series of steps adapted to be mounted to said stringers, each said step comprising a tread and a riser, the kit further comprising a plurality of step mounting brackets used to mount said treads and said risers to said stringers, wherein said treads and said risers are adapted to extend horizontally

between said stringers and to be fastened thereto such that a mounted tread defines a substantially horizontal tread surface and a mounted riser defines a substantially vertical riser surface extending upwardly from an area proximal to a rear end of a lower mounted tread and an area proximal to a front end of an adjacently mounted higher tread, wherein a first flange of said step mounting brackets is adapted to be fastened within a recess provisioned therefor in a longitudinal face of longitudinal ends of both said treads and said risers and wherein a second flange of said step mounting brackets is adapted to be fastened to said stringers.

78. The kit as claimed in Claim 77, wherein said recess in both said risers and said treads are adapted to accept the first flange of said L-shaped brackets fully therein such that once mounted said first flanges remain out of view from a top side and a front side of said steps.

79. The kit as claimed in Claim 78, the kit further comprising finishing elements adapted to be mounted between each said step to said stringers for the hiding thereof.

80. The kit as claimed in Claim 79, the kit further comprising finishing brackets, said finishing brackets comprising a first flange adapted to be fastened fully within said recess of said risers and said treads and a second flange adapted to secure said finishing elements between same and said lateral face of both said treads and said risers.

81. The kit as claimed in Claim 80, the kit further comprising mouldings adapted to be mounted above said finishing elements such that once said steps, said finishing elements and said mouldings are mounted on said stringers, said stringers, said step mounting brackets and said finishing brackets remain hidden from view from a top side and a front side of said steps.

82. The kit as claimed in Claim 81, wherein a thickness of said stringers provides a longitudinal adjustment range for an

installation of said treads and said risers thereon to compensate for imperfections in said lining structures and wherein said mouldings provide a means for hiding said lateral adjustment range and thus said imperfections.

83. The kit as claimed in Claim 77, the kit further comprising stringer covering means adapted to cover exposed surfaces of said stringers on an underside of said staircase.

84. A method for erecting a self-standing staircase between an upper structure and a lower structure, the method comprising the steps of:

- a. providing a set of step support units, a set of steps, two upper support structures and two lower support structures, said step support units each comprising a first mating structure extending substantially laterally from a first lateral side thereof and a complementary mating structure extending substantially laterally from an opposing lateral side thereof;
- b. building two substantially similar stringers by matingly coupling said first mating structure of said step support units with said complementary mating structure of successive adjacent step support units in a same stringer;
- c. respectively coupling said upper support structures and said lower support structures to uppermost and lowermost step support units of each said stringers;
- d. respectively mounting said upper and lower support structures to the upper and lower structures; and
- e. mounting said steps on said step support units.

85. The method as claimed in Claim 84, wherein said first mating structure is a male mating structure and said complementary mating structure is a female mating structure.

86. A method for erecting a self-standing curling staircase along a wall defining an outside curl of the staircase between an upper structure and a lower structure, the method comprising the steps of:

- a. providing a set of modular step support units, a set of wall mountable step support units, a set of steps, said modular step support units each comprising at least one shaft extending vertically at least partially along a first lateral side thereof and at least one coupling arm extending substantially laterally and horizontally from an opposing lateral side thereof;
- b. building a curling stringer by coupling said shaft of said modular step support units with said coupling arm of successive adjacent modular step support units;
- c. securing said stringer between the upper and lower structures;
- d. mounting said wall mountable step support units to the wall such that once mounted, said wall mountable step support units operate cooperatively with said modular step support units; and
- e. mounting said steps on said step support units.

87. A method for erecting a staircase between two lining structures, the method comprising the steps of:

- a. providing two risers each defined by successive horizontal tread bearing and vertical riser bearing surfaces, a set steps comprising a set of treads and a set of risers, a set of step mounting brackets, a set of finishing modules and a set of finishing brackets;
- b. mounting said stringers to the lining structures;
- c. fastening a first flange of said step mounting brackets and a first flange of said finishing brackets within a recess provided therefor in longitudinal ends of said treads and said risers;

- d. successively mounting said treads and said risers by respectively fastening a second flange of said step mounting brackets to said tread and said riser bearing surfaces; and
- e. inserting said finishing modules between each said step along the lining structures by sliding said finishing modules between said longitudinal ends and a second flange of said finishing brackets.

88. The method as claimed in Claim 87 further comprising the steps of:

- a. providing a moulding for each stringer; and
- b. mounting said mouldings to the lining structures above such that an upper edge of said finishing modules is hidden thereby.

89. The method as claimed in Claim 88, wherein said mouldings are adapted to accept said upper edge of said finishing modules within a recess provided therefor in a bottom edge of said mouldings.

90. The method as claimed in Claim 87 further comprising the steps of:

- a. providing a further finishing modules; and
- b. mounting said further finishing modules on exposed surfaces of said stringers underneath the staircase such that said exposed surfaces are fully hidden thereby.